US-PAT-NO: 6590889

DOCUMENT-IDENTIFIER: US 6590889 B1

TITLE: Data communications system and hybrid time-code multiplexing method

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Brief Summary Text - BSTX (3):

Current systems use a variety of schemes for encoding and multiplexing digital data streams for communications between terminals including frequency division multiple access (FDMA), time division multiple access (TDMA), and code division multiple access (**CDMA**). Some systems have also been devised which use various combinations of FDMA, TDMA, and **CDMA**.

Brief Summary Text - BSTX (7):

Conventional satellite, or any other form of radio relay, systems using **CDMA** typically cannot handle reception of signals at varying power levels from different terminals, a problem normally referred as the "near-far problem."

Detailed Description Text - DETX (15):

The container assembler 414 (FIG. 4) then packages the QAM cells into the payload of a container 416. Payloads are preferably 672 symbols long, and exactly "m" QAM-cells are concatenated, scrambled, and loaded into the payload. A **header** is then assembled for the **payload,** preferably containing, along with other information, information on the **modulation** level used for encoding the **payload**. Unlike the **payload, the header is preferably modulated** using 45 degree offset Binary Phase Shift Key (BPSK).

QAM parallel

BPSK → serial.

Detailed Description Text - DETX (21):

As previously indicated, a container 300 (FIG. 3) preferably includes both a **header** 302 and a **payload** 304, where the **header** 302 comprises 96 **header** symbols **modulated** with 45 degree offset BPSK and the **payload** comprises 672 info-symbols **modulated** with 2.sup.m -ary QAM. Collectively, the header-symbols and info-symbols may be referred to as data-symbols. The **modulation** level is

preferably the same for all info-symbols of all **payloads** of an information packet, but may be different for **payloads** of different information packets.

Detailed Description Text - DETX (25):

As previously indicated, the **payload is preferably modulated** using 2.sup.m -ary QAM constellations that are obtained from N.sup.2 -ary QAM constellations. When m is odd, these 2.sup.m -ary QAM constellations are obtained by puncturing an N.sup.2 -ary QAM constellation. The same level of **modulation** (m) is preferably used for **modulating** all symbols in the **payload**. It is possible, however, to **modulate the payloads** of different containers with different levels of **modulation**. The **header, however, is preferably modulated** using 45 degree offset BPSK.

Detailed Description Text - DETX (27):

The payload of each container carries "m" QAM cells, with the exception of the payload of the last container that may carry fewer than m QAM cells. The actual number of QAM cells contained in the last container depends on the length of the packet and on the selected modulation level. The **modulation** level is preferably kept constant for all **payloads** originating from a single information packet. The modulation level may vary from packet to packet and is preferably selected as a function of a target bit error rate (BER), or Quality of Service (QOS), for the packet and an available (SNR). As such, it is possible to independently select the modulation level m to be used with a particular packet or channel. In addition to selecting the modulation level m based on the BER or QOS for the information and the available SNR, a power level for transmitting the packet may also be determined based on this information.

Claims Text - CLTX (25):

25. The method of claim 1, further comprising steps of generating a plurality of header bits; generating a plurality of payload bits; **modulating the header** bits with a first **modulation**; and **modulating the payload** bits with a second **modulation**; wherein the step of transmitting the information includes the substeps of transmitting the **modulated the header** bits, and transmitting the **modulated payload** bits.

Claims Text - CLTX (53):

53. The node of claim 29, further comprising means for generating a plurality of header bits; means for generating a plurality of payload bits;

means for **modulating the header** bits with a first **modulation**; and means for **modulating the payload** bits with a second **modulation**; wherein the means for transmitting the information includes means for transmitting the **modulated header** bits, and means for transmitting the **modulated payload** bits.